

Application No. 10/562,581
October 26, 2007
Reply to the Office Action dated June 29, 2007
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AMENDMENTS TO THE DRAWINGS:

The attached sheet of Drawings includes changes to Figs. 19 and 20. This sheet, which includes Figs. 19 and 20, replaces the original sheet including Figs. 19 and 20.

Attachment: One (1) Replacement Sheet.

REMARKS/ARGUMENTS

Claims 7-15 are pending in this application. By this Amendment, Applicant amends Claim 7 and the drawings.

Applicant amends Figs. 19 and 20 in the attached replacement sheet of drawings to correct a clear mistake in the originally filed application. Support the amendments to Figs. 19 and 20 is clearly provided in paragraphs [0040], [0041], and [0084]-[0091] of the Substitute Specification.

The Examiner acknowledged Applicant's claim for foreign priority based on Japanese Application No. 2004-235029 filed on August 12, 2004. However, the Examiner alleged that the certified copy of this application has not been filed and is required by 35 U.S.C. 119(b). This is clearly incorrect since the present application is a National Stage Application of previously filed International Application No. PCT/JP2005/009745. Thus, the certified copy of the Japanese priority application should have been directly transmitted from the International Bureau to the U.S. Patent Office. Accordingly, Applicant respectfully requests that the Examiner acknowledge receipt of the certified copy of Japanese Application No. 2004-235029 in the next Office Action.

Claims 7, 8, and 10-15 were rejected under 35 U.S.C. § 102(b) as being anticipated by Nakamura et al. (US 2003/0107300). Claim 9 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Nakamura et al. in view of Mizusawa (U.S. 6,778,029) or Applicant's Admitted Prior Art (AAPA). Applicant respectfully traverses the rejection of Claims 7-15.

Claim 7 has been amended to recite:

A piezoelectric electroacoustic transducer comprising:
a quadrilateral piezoelectric diaphragm arranged to be vibrated in a thickness direction of the diaphragm by applying an alternating signal to lead electrodes thereof;
a casing including a supporting portion disposed on an inner circumference of the casing, the supporting portion supporting an outer circumference of said piezoelectric diaphragm;

first and second terminals that are fixed to said casing so that inner connecting portions are exposed on said inner circumference of the casing; and

conductive adhesives electrically connecting the lead electrodes of the piezoelectric diaphragm and the inner connecting portions of the first and second terminals; wherein

one of said conductive adhesives is arranged between the inner connecting portion of said first terminal and one of the lead electrodes near one corner of said piezoelectric diaphragm;

the other conductive adhesive is arranged between the inner connecting portion of said second terminal and the other lead electrode near another corner of said piezoelectric diaphragm which is adjacent to the one corner of said piezoelectric diaphragm; and

the one corner and the another corner of the piezoelectric diaphragm are disposed at opposite ends of one side of the piezoelectric diaphragm. (emphasis added)

With the unique combination and arrangement of features recited in Applicant's Claim 7, including the features of "one of said conductive adhesives is arranged between the inner connecting portion of said first terminal and one of the lead electrodes near one corner of said piezoelectric diaphragm," "the other conductive adhesive is arranged between the inner connecting portion of said second terminal and the other lead electrode near another corner of said piezoelectric diaphragm which is adjacent to the one corner of said piezoelectric diaphragm," and "the one corner and the another corner of the piezoelectric diaphragm are disposed at opposite ends of one side of the piezoelectric diaphragm," Applicant has been able to provide a piezoelectric electroacoustic transducer, in which the coating positions of conductive adhesives are located such that the node of vibrations shifts to the outside, the resonant frequency of a diaphragm is lowered, and the change in the resonant frequency of the diaphragm as a result of temperature changes is small (see, for example, paragraph [0008] on page 3 of the Substitute Specification).

The Examiner alleged that Nakamura et al. teaches all of the features recited in Applicant's Claim 7.

Although Applicant disagrees with the Examiner's allegations, in order to expedite prosecution of the present application, Applicant's Claim 7 has been amended to recite the feature of "the one corner and the another corner of the piezoelectric diaphragm are disposed at opposite ends of one side of the piezoelectric diaphragm." Support for this feature is found, for example, in Figs. 1, 2, 9A, and 14 of the originally filed drawings.

In contrast to Applicant's Claim 7, as shown in Figs. 1 and 10 of Nakamura et al., the conductive adhesives 14a and 14b of Nakamura et al. are arranged near diametrically opposed corners of the piezoelectric diaphragm 1, wherein the diametrically opposed corners are disposed at ends of two different sides of the piezoelectric diaphragm 1, **NOT** at opposite ends of one side of the piezoelectric diaphragm. Nakamura et al. fails to teach or suggest that the conductive adhesives 14a and 14b could or should be arranged at any other locations other than near diametrically opposed corners that are disposed at ends of two different sides of the piezoelectric diaphragm 1, and certainly fails to teach or suggest the features of "one of said conductive adhesives is arranged between the inner connecting portion of said first terminal and one of the lead electrodes near one corner of said piezoelectric diaphragm," "the other conductive adhesive is arranged between the inner connecting portion of said second terminal and the other lead electrode near another corner of said piezoelectric diaphragm which is adjacent to the one corner of said piezoelectric diaphragm," and "the one corner and the another corner of the piezoelectric diaphragm are disposed at opposite ends of one side of the piezoelectric diaphragm" as recited in Applicant's Claim 7.

Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of Claim 7 under 35 U.S.C. § 102(b) as being anticipated by Nakamura et al.

In anticipation of the Examiner rejecting Claim 7, as amended, (in a similar manner as Claim 9) under 35 U.S.C. § 103(a) as allegedly being unpatentable over

Nakamura et al. in view of Mizusawa or AAPA, Applicant respectfully submits that the combination of Nakamura et al. and Mizusawa fails to teach or suggest the unique combination and arrangement of features recited in Applicant's Claim 7.

First, contrary to the Examiner's allegations, Fig. 19 of the present application is NOT prior art. As clearly disclosed in paragraphs [0040], [0041], and [0084]-[0091] of the Substitute Specification, Fig. 19 shows a known diaphragm 30 used in a fourth preferred embodiment of the present invention. In other words, although the basic structure of the diaphragm 30, i.e., the laminated piezoelectric layers 31, 32, is known, the feature of the terminals 33, 38 and the notches 39a, 39b being arranged near two adjacent corners of the diaphragm 30, where the adjacent corners are disposed at opposite ends of one side of the piezoelectric diaphragm 30 is specifically disclosed as being elements of the present invention, and NOT of the prior art.

Applicant notes that Figs. 19 and 20 were incorrectly labeled as "PRIOR ART." Accordingly, as noted above, Applicant submits herewith a replacement sheet of drawings including Figs. 19 and 20 which are correctly not labeled as prior art.

Second, the Examiner is reminded that "[i]n order to rely on a reference as a basis for rejection of an Applicant's invention, the reference must either be in the field of Applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." See In re Oetiker, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992) and MPEP § 2141.01(a). That is, the Examiner must rely upon analogous art to reject Applicant's claims.

The present invention is directed to a piezoelectric electroacoustic transducer for use as piezoelectric receivers and sounders, as recited in Applicant's Claim 7. In contrast, Mizusawa is directed to the field of surface mount crystal units for use as surface-mount crystal oscillators and filters. Thus, the present invention and Mizusawa are clearly in different fields of endeavor.

The present invention is directed to solving a problems of conductive adhesives causing a shift in the node of vibrations to the inside, a lowering of the resonant

frequency of the diaphragm, and an increased change in the resonant frequency of the diaphragm as a result of temperature changes (see, for example, paragraph [0008] on page 3 of the Substitute Specification). In contrast, Mizusawa is directed to solving the problem of reducing an area necessary to mount the crystal unit on a wiring board (see, for example, col. 1, lines 7-10 of Mizusawa). Thus, the present invention and Mizusawa are clearly directed to solving different problems experienced with entirely different devices from two completely different fields of endeavor.

Therefore, Applicant respectfully submits that Mizusawa is clearly non-analogous art, that the Examiner has improperly relied upon Mizusawa to reject Applicant's original Claim 9, and that it would be improper for the Examiner to rely upon Mizusawa to reject Applicant's Claim 7.

Third, even assuming *arguendo* that Mizusawa was directed to analogous art, there would have been no proper motivation to combine the alleged teachings of Mizusawa with Nakamura et al.

The Examiner alleged that the motivation to combine Mizusawa with Nakamura et al. would have been "for the benefit of simplifying the means of connection to the piezoelectric diaphragm and eliminating the need for a support means at one end of the diaphragm." However, Mizusawa fails to teach or suggest that arranging the terminals 17 near adjacent corners of the quartz crystal blank 2, where the adjacent corners are disposed at opposite ends of one side of the quartz crystal blank 2 would simplify the means of connection to the planar substrate 11. In fact, the Examiner has provided no evidence to support an allegation that arranging terminals or conductive adhesives near adjacent corners of a piezoelectric diaphragm, where the adjacent corners are disposed at opposite ends of one side of the piezoelectric diaphragm would simplify the means of connection of the piezoelectric diaphragm to a substrate or a case.

In addition, since the perimeter of the piezoelectric diaphragm 1 of Nakamura et al. is, and must be, supported along at least two sides thereof by the case 10 in order to operate properly, one of ordinary skill in the art would clearly not have been motivated

to combine Mizusawa with Nakamura et al. for the alleged benefit of “eliminating the need for a support means at one end of the diaphragm.” In fact, regardless of the location of the conductive adhesives 14a and 14b in the piezoelectric transducer of Nakamura et al., i.e., near opposed corners of the piezoelectric diaphragm 1 or near corners that are disposed at opposite ends of one side of the piezoelectric diaphragm 1, the piezoelectric diaphragm 1 of Nakamura et al. would nonetheless be supported along at least two sides thereof. Thus, even if the conductive adhesives 14a and 14b of Nakamura et al. were provided near corners disposed at opposite ends of one side of the piezoelectric diaphragm 1 as allegedly taught by Mizusawa, the piezoelectric diaphragm 1 of Nakamura et al. would still be supported along at least two sides thereof by the case 10.

Therefore, Applicant respectfully submits that one of ordinary skill in the art would clearly not have been motivated to combine the alleged teachings of Mizusawa with Nakamura et al. to (1) simplify the means of connection to the piezoelectric diaphragm, (2) eliminate the need for a support means at one end of the diaphragm, or (3) any other reason. In fact, such a modification as alleged by the Examiner would provide absolutely no benefit whatsoever.

Accordingly, Applicant respectfully submits that Nakamura et al. and Mizusawa, applied alone or in combination, fail to teach or suggest the unique combination and arrangement of features recited in Applicant’s Claim 7.

In view of the foregoing amendments and remarks, Applicant respectfully submits that Claim 7 is allowable. Claims 8-15 depend upon Claim 7, and are therefore allowable for at least the reasons that Claim 7 is allowable.

In view of the foregoing amendments and remarks, Applicant respectfully submits that this application is in condition for allowance. Favorable consideration and prompt allowance are solicited.

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To the extent necessary, Applicant petitions the Commissioner for a One-Month Extension of Time, extending to October 29, 2007, the period for response to the Office Action dated June 29, 2007.

The Commissioner is authorized to charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 50-1353.

Respectfully submitted,

Dated: October 26, 2007

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